Cortical tracking of native and non-native speech in bilingual and monolingual Spanish/Basque infants at 4 and 7 months

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During their first year, infants' speech processing abilities become attuned to their native language(s), enabling the extraction of meaningful linguistic information from the speech signal. Recently, cortical tracking of speech (CTS), the synchronization between neural oscillations and the temporal structure of the speech envelope, has been proposed as the neural mechanism underpinning the ability to process speech information at different timescales. Here, we tested this proposal by assessing CTS development at slow frequency rates (<3Hz, Delta band, corresponding to the phrasal rate in speech, and 4-8Hz, Theta band, corresponding to the syllable rate). Additionally, we investigated the potential influence of bilingualism on CTS given bilingual infants' additional challenges of differentiating and acquiring two linguistic systems instead of one. We will present preliminary data (33 monolingual; 26 bilingual, L1 exposure M=60%) from a large-scale longitudinal study of language development in monolingually- and bilingually-raised children acquiring Spanish and/or Basque from 4 months to 7 years. We assessed CTS at 4 and 7 months to test the prediction that CTS efficiency to infants' native language(s) compared to a non-native language increases with age. We recorded continuous electroencephalography while infants listened to ~5-minute stories in Spanish, Basque (native/dominant languages), and English (non-native language). Preliminary analyses of speech-brain coherence unveil distinct CTS patterns for native/dominant and nonnative languages. Delta and Theta coherence was higher for the nonnative compared to the native/dominant language. Bilingualism and age effects were not significant, except for a trend for a decrease in Theta coherence from 4 to 7 months. These findings confirm that infants differentially process native and nonnative languages already at 4 months. We will discuss the speech-brain coherence patterns in relation to a potential developmental shift from speech processing based on large-scale (encoded by Delta and Theta frequency bands) to faster and smaller-scale information in speech.